

What is claimed is:

1. In a workpiece powered cutter having a housing 10, 11, two circularly shaped spur gears 16, 17 with gear teeth 80 projecting thereon and being rotatably mounted in said housing about a common axis A and being included in respective gear trains, a motor 33 mounted in said housing for rotating said gears, said housing and said gears each having a gap 52 extending therein and all said gaps being alignable together in only one direction viewed parallel to said axis for reception of a workpiece 14 in the aligned said gaps, said gears having cam slots 61, 69, 58, and 67, cam follower shafts 56 and 66 connected to said gears through said cam slots for having said gear 17 in rotatably driven relationship with said gear 16, a cutting blade 22 supported by said shaft 56 and rollers 64 supported by shaft 66 and with said blade and said rollers projecting into said gaps for engagement of and cutting of said workpiece upon applying said rotation of said gear 17 at a rotation speed different from the rotation speed of said gear 16 and thereby move said shafts in said slots and radially of said axis, the improvement comprising:

said gears 16, 17 have spur gear tooth pitch diameters D-1 and D-2 in respective lengths extending through said axis and diametrically across said gears and with the said length of said pitch diameter D-1 of said gear 17 being different from the said length of said pitch diameter D-2 of said gear 16 for the rotation of said gear 17 at a rotation speed different from the rotation speed of said gear 16.

2. The workpiece powered cutter as claimed in claim 1, including:

a clutch 81 operatively interposed between said gear trains for rotation connection therebetween and for rotation connection between said gears 16 and 17.

3. The workpiece powered cutter as claimed in claim 1, including:

said two gear trains each being a plurality of gears and including said gears 16 and 17 and including two other gears 44, 77 of pitch diameters different from each other, and

a clutch 81 rotationally connected with said two gear trains for rotationally connecting said gears 44, 77 together for inducing said different rotation speeds of said gears 16, 17.

4. The workpiece powered cutter, as claimed in claim 3, including:

a friction member 116 included in said clutch for providing operational friction drag controlling rotation action transmitted through said clutch, and

a movable adjuster operative on said friction member for altering the operational friction drag of said friction member to thereby control the relative rotation speeds of said gears.

5. The workpiece powered cutter, as claimed in claim 3, wherein:

said pitch diameters of said gears 44 and 77 are different from each other in the same respective relationship as said pitch diameters D-1 and D-2 of gears 16 and 17.

6. The workpiece powered cutter, as claimed in claim 1, including:

a cam plate 18 rotatably connected with said gears 16, 17 and having cam slots 59 and 68 arcuately extending radially inwardly in a curving direction the same as that of the direction of the differential rotation.

7. The workpiece powered cutter, as claimed in claim 1, including:

one of said gears 158 in one of said gear trains is rotatably connected to a shaft 160 exposed to the exterior of said housing 10 as a power-take-off for rotational drive reception of an accessory tool 151, 152.

8. The workpiece powered cutter, as claimed in claim 1, including:

said housing having a window 141 therein for visually exposing said workpiece disposed in said housing and thereby permit aligning said blade 22 on said workpiece for cutting location.

9. The workpiece powered cutter, as claimed in claim 1, including:

a trigger 83 having two stages of trigger motion for controlling the differential rotation between said gears 16 and 17, and with a first stage of trigger motion for preliminary movement of said blade and said rollers into contact with the workpiece, and with a second stage of trigger motion for cutting said workpiece.

10. The workpiece powered cutter, as claimed in claim 9, including:

a clutch 81 operative on said gears 16 and 17 for inducing the second stage for cutting said workpiece.

11. The workpiece powered cutter, as claimed in claim 1, including:

said gears 16 and 17 and said housing 10 having mutually engageable tongue-and-groove circular shoulders 27, 29, 28, and 31 for radial support of said gears in said housing.

12. The workpiece powered cutter, as claimed in claim 1, wherein:

said gear trains include gears 44, 77 respectively gear tooth connected with gears 16, 17, and

a clutch 81 interposed between said gears 44, 77 for rotation control of gears 16, 17 and thus control the rate of cutting of said workpiece per revolution of all said gears.

13. The workpiece powered cutter, as claimed in claim 12, including:

said clutch including a friction member 132 operatively interposed between said gears 44 and 77 for effecting the transmission of rotation between said gears 44 and 77, and

a manual control 128 on the exterior of said housing and connected with said friction member for altering the friction effect of said friction member on said gears 44 and 77 and thereby alter the transmission of rotation between said gears 44 and 77.

14. The workpiece powered cutter, as claimed in claim 1, including:

workpiece guides 148, 149 movably mounted on said housing for engaging the workpiece and guiding the engagement during the cutting action.

15. The workpiece powered cutter, as claimed in claim 1, including:

feed gears 17, 77 connected with said blade 22 and said rollers 64 for radially moving said blade and said rollers toward the workpiece,

rotation drive gears 16, 44 rotationally connected with said feed gears in lost motion therebetween, and

rotation drive power controls 84, 101, 103 operative on said feed gears for moving said blade and said rollers into contact with the workpiece while said drive gears are not

rotating and thereby size the workpiece.

16. The workpiece powered cutter, as claimed in claim 1, including:

a detent 86 releasably connected with said gear 17 for temporarily holding gear 17 in an initial rotated position for reception of the tube to be cut.

17. In a workpiece powered cutter having a housing 10, 11, two circularly shaped spur gears 16, 17 with gear teeth 80 projecting thereon and being rotatably mounted in said housing about a common axis A and being included in respective gear trains, a motor 33 mounted in said housing for rotating said gears, said housing and said gears each having a gap 52 extending therein and all said gaps being alignable together in only one direction viewed parallel to said axis for reception of a workpiece 14 in the aligned said gaps, said gears having cam slots 61, 69, 58, and 67, cam follower shafts 56 and 66 connected to said gears through said cam slots for having said gear 17 in rotatably driven relationship with said gear 16, a cutting blade 22 supported by said shaft 56 and rollers 64 supported by shaft 66 and with said blade and said rollers projecting into said gaps for engagement of and cutting of said workpiece upon applying said rotation of said gear 17 at a rotation speed different from the rotation speed of said gear 16 and thereby move said shafts in said slots and radially of said axis, the improvement comprising:

a clutch 81 operative on said gears 16, 17 for controlling rotation speed differential, and

a manually operable control 128 on the exterior of said housing 10 for adjusting said clutch while cutting said workpiece.

18. In a workpiece powered cutter having a housing 10, 11, two circularly shaped spur gears 16, 17 with gear teeth 80 projecting thereon and being rotatably mounted in said housing about a common axis A and being included in respective gear trains, a motor 33 mounted in said housing for rotating said gears, said housing and said gears each having a gap 52 extending therein and all said gaps being alignable together in only one direction viewed parallel to said axis for reception of a workpiece 14 in the aligned said gaps, said gears having cam slots 61, 69, 58, and 67, cam follower shafts 56 and 66 connected to said gears through said cam slots for having said gear 17 in rotatably driven lost motion relationship with said gear 16, a cutting blade 22 supported by said shaft 56 and rollers 64 supported by said shaft 66 and with said blade and said rollers projecting into said gaps for engagement of and cutting of said workpiece upon applying said rotation of said gear 17 at a rotation speed different from the rotation speed of said gear 16 and thereby move said shafts in said slots and radially of said axis, the improvement comprising:

- a gear 158 rotatable on said housing, and
- a shaft 159 rotated by said gear 158 and exposed to the exterior of said housing for power-take-off drives of a cone 151 and a brush 152 for treating the cut tube.

19. The workpiece powered cutter, as claimed in claim 18, including:

- a shiftable support 157 on said housing and supporting said gear 158 and said shaft 159 for shifting said gear 158 between rotation drive connection with said motor and with said gear 17 for alternate said tube cutting and said tube treating.

20. The workpiece powered cutter, as claimed in claim 19, including:

a detent 86 releasably connected with said gear 17 for temporarily holding gear 17 in an initial rotated position for reception of the tube to be cut.